

ON THE ROCKS

Most houses in Carlton are built on soils derived from superficial Quaternary deposits of clay, sand and gravel deposited after the last glaciation. Beneath these deposits, and sometimes only a foot or two beneath the surface, lie the Triassic sedimentary rocks of the Mercia Mudstone Group (MMG), formerly known as the Keuper Marl. This Group was originally about 600m thick, and non-geologists may be surprised that the Precambrian and Cambrian hills of Charnwood Forest were once completely buried beneath these sediments. In Charnwood, erosion has removed about 300m of the Mercia Mudstone Group, thereby exhuming a much older landscape.

The MMG was deposited in a hot environment, probably an arid coastal flat with ephemeral lakes subject to marine inundations and local floods. Some of the massive mudstones probably resulted from the accumulation of wind-blown dust (known as loess) on wet mudflats. The particles of loess are very small (silt-sized) grains of quartz and are commonly formed in glacial conditions - loess soils are common in the Soviet Union. New work now suggests that the original dust particles in the MMG may have been a material known as 'parna', which is a common Quaternary sediment in Australia. The grains of parna differ from true loess in being pellets made of particles of clay, which form in hot conditions when arid winds blow over evaporating lakes, soils and clay surfaces.

The present mechanical properties of MMG sediments derive from their constituent particles and the way they pack together in the rock. Classic loess collapses by about 15% when compacted, whereas parna could collapse by more than 20%. This is not just of academic interest, because many urban areas and their infrastructure are built on the MMG, which is often encountered in foundations and has anomalous engineering behaviour, particularly when weathered or associated with groundwater.

For more details see: I Jefferson, M Rosenbaum & I Smalley. Mercia Mudstone as a Triassic aeolian desert sediment. *Mercian Geologist* **15** (3) 157-162.

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